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AUTHOR Jennings, Kay D.; Connors, Robin E.
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ABSTRACT

Relationships between mothers' behaviors and (1) their children's verbal and nonverbal cognitive functioning, (2) their children's level of play, and (3) mothers' perceptions of their children's task motivation were investigated. Forty-four mothers and their preschool children from a wide range of socioeconomic backgrounds participated in the study; there were 25 boys and 19 girls in the sample. Mother-child interaction was observed in the home during the performance of structured tasks and during free play. Following these tasks, children were asked to play with their own toys; during 10 minutes of free play maternal behaviors were observed. Children's cognitive functioning and level of play were assessed at school with the McCarthy Scales of Children's Abilities, and children's play was observed during their regular free play period at school. Mothers' perceptions of their children's task motivation was assessed by means of a 36-item questionnaire: the Mother's Observation of Mastery Motivation. Results indicate that quality of maternal interaction is related to children's cognitive development and to the quality of children's play. Mothers' willingness to give more control to their children apparently facilitates cognitive growth by allowing children greater freedom to explore their environment. Maternal warmth appears to enhance children's ability to organize their play activities in meaningful ways. (RH)

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# Children's Cognitive Development and Free Play: Relations to Maternal Behavior

Kay D. Jennings and Robin E. Connors

University of Pittsburgh
Western Psychiatric Institute and Clinic
3811 O'Hara Street
Pittsburgh, PA 15213

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Children's cognitive development has frequently been found to relate to their home environment. Most studies have focused on relationships with socioeconomic status (e.g., Golden, Birns, Bridges, & Moss, 1971), parents' IQ (e.g., McCall, Appelbaum, & Hogarty, 1973) or general home environment (e.g., Elardo, Bradley, & Caldwell, 1975). When relationships have been found between parental behavior and child development, they have often disappeared when socioeconomic status was taken into account. Recent reviews of this literature have disagreed on whether mothers' personal style of interaction has any effect on children's cognitive growth. Rutter (1979), for example, concluded that "personal mothering was largely irrelevant for cognitive growth." He appears to have ignored several studies of infancy in which quality of maternal interaction was found to relate to cognitive development (e.g., Yarrow, Rubenstein, & Pedersen, 1975; Clarke-Stewart, Vanderstroep & Killian, 1979). Masters (1981), in his review, concluded that maternal interaction during infancy was important for cognitive growth but questioned the impact of maternal behavior in the later preschool years and beyond. There is some recent evidence to dispute this conclusion. In a recent study of Japanese preschool children, Hatano, Miyake & Tajima (1980) found that different maternal behaviors were related to different aspects of children's cognitive development; specifically, maternal warmth was related to Binet IQ and maternal directiveness was related (negatively) to Piagetian conservation ability. These relationships were found even when socioeconomic status was controlled.

In the present study, we examined the relationship between mothers' behaviors and (a) their children's cognitive functioning (both verbal and nonverbal), (b) their children's level of play, and (c) the mothers' perceptions of their children's task motivation. Observations of children's play were

included as measures of their ability to meaningfully structure interactions with their environment. Play provides an opportunity for children to test out their ideas about the world; thus, play both reflects children's current cognitive understanding of the world and provides a vehicle for further learning. Furthermore, the quality of play provides an index of general competence and adaptiveness. The mothers' perceptions of their children's task motivation were included to determine possible influences on the mothers' behavior with their children. Our primary interest was how maternal behaviors may influence their children's development. By taking into account maternal perceptions of their children, we hoped to be able to partially disentangle the reciprocal influences between mother and child.

## METHOD

Forty-four mothers and their preschool children participated in this study which was part of a larger project. The children in the present study ranged in age from 3 years to 4½ years (mean age was 3 years and 9 months). There were 25 boys and 19 girls; 33 children were white, eight were black and three were oriental or other. They came from a wide range of socioeconomic backgrounds. Families were recruited from seven nursery schools and day care centers within a five mile radius of the University of Pittsburgh. Approximately half of the parents informed of the study chose to participate. One mother-child pair was dropped from the sample because the child had serious speech delays.

Mother-child interaction was observed in the home during both structured tasks and free play. The examiner presented the child with a series of tasks that varied in degree of structure and level of difficulty. The mother was asked to play with her child as she normally does and to help when her child seemed to need it. The tasks were playing with a pegboard, constructing objects

from a simple erector set and forming designs from parquet blocks. Following these tasks, the examiner asked the child to play with his or her own toys for ten minutes to allow observation of maternal behaviors during free play.

Maternal warmth and directiveness were assessed both by means of time-sampling and by overall ratings. Two time-sampled measures were used: the frequency of praise or affection and the mean level of maternal control. Maternal control was assessed every 15 seconds by coding locus of control of the child's activity (ranging from child exclusively controls activity to mother exclusively controls activity). Only the first minute of each task was used in order to control for the child requiring help to complete the task. The overall ratings of warmth and directiveness were summaries of several more specific ratings. The warmth rating was a composite of three 5-point rating scales: praise vs. criticism, sensitivity to child's needs vs. insensitivity, and pleasure in being with child vs. no pleasure. The directiveness rating was composed of three specific, 5-point ratings: pressing the child to do the task well vs. not pressing, orienting the child's activities vs. allowing the child to initiate, and controlling the child's behavior vs. permissiveness. These ratings were derived from 14 scales developed by Hatano, Miyake, & Tajima (1980). Socioeconomic status was assessed by a modified Hollingshead scale.

Children's cognitive functioning and level of play were assessed at school prior to the mother-child session. The McCarthy Scales of Children's Abilities were used because measures of both verbal and nonverbal abilities are obtained. The children's play was observed at school during their regular free play period (without mothers present). Each child was observed for a total of 40 minutes, usually spread over two days. The free play measures were the mean duration of play activities, unfocused time (percent of time spent

watching or wandering) and complexity of play (mean number of subactivities per play activity).

Mothers' perceptions of their children's task motivation was assessed by means of a questionnaire. This 36-item questionnaire (Mother's Observation of Mastery Motivation) was developed by Morgan and Harmon (1982). It is based partly on prior work by Harter (1981). A factor analysis on a pilot sample by Morgan (1982) indicated five factors. These were: (1) intrinsically motivated, (2) prefers easy tasks, (3) seeks adult help or approval, (4) seeks adult structure, and (5) resists adult direction. This questionnaire was given to the mothers at the end of the mother-child session; the mothers returned them by mail.

The mother-child session, IQ assessment and free play observation were each assessed independently by different persons. Reliability was assessed by videotape (maternal behaviors) and by simultaneous observation (free play). Reliability coefficients were all satisfactory, ranging from .83 to .99, with an average of .94.

## RESULTS

In presenting the results, we will first focus on the relationships between the mothers' behaviors and their children's cognitive functioning and level of play. Then we will discuss how socioeconomic status affects these relationships. Finally, we will try to disentangle some of the mutual influences between mothers and their children. To provide a stage for presenting these results, we should note that mothers' behaviors were not related to their children's sex, birth order, age or to the number of the children in the family.

Our primary interest was in the relationship between maternal behaviors and children's functioning. Mothers' directiveness and warmth were found to

relate to their children's intellectual functioning and level of play. These relationships are shown in Table 1. Less controlling mothers had children with higher IQs ($r = -.36$, $p < .05$)--particularly nonverbal IQs ($p = -.44$, $p < .05$). There was no relationship, however, between maternal control and children's level of play. As would be expected, the rating of maternal directiveness showed a similar pattern; however the relationships were not strong enough to be significant. With regard to warmth, mothers who gave more praise and affection had children with higher IQs ($r = .37$, $p < .05$); in addition, their children engaged in higher levels of play as indicated by longer ($r = .36$, $p < .05$) and more complex play activities ($r = .38$, $p < .05$) and by less unfocused time ($r = -.31$, $p < .05$). As would be expected, the rating of warmth showed a similar pattern but the correlations with play behavior were not significant.

Next we examined the effect of socioeconomic status on mothers' behaviors. Socioeconomic status was related to the amount of praise and affection shown by mothers ($r = .42$, $p < .05$) and also to the rating of warmth ($r = .34$, $p < .05$). Middle class mothers praised their children more and showed more affection; similarly, they were rated as more warm. Socioeconomic status was not significantly related to maternal control or the rating of directiveness.

We wondered then whether the relationships found between maternal warmth and the child measures were simply part of a more general relationship between SES and child functioning. In order to control for socioeconomic standing, we redid our analyses with SES partialled out. These partial correlations are shown in Table 2. With SES partialled out, maternal control was still related to children's IQ ($r = -.30$, $p < .10$) and maternal praise and affection was still related to level of play. One set of correlations, however, were no longer significant: praise/affection and the rating of warmth were no longer related to IQ.

These findings indicate that mothers who are non-directive tend to have brighter children and mothers who are warmer tend to have children who engage in higher levels of play. These relationships remained even when socioeconomic status was controlled. These correlational findings do not indicate processes involved. Perhaps brighter children require less direction from their mothers because the children are more able to solve problems on their own. On the other hand, perhaps mothers who routinely allow their children to solve problems on their own, enhance their children's intellectual development over time.

In a beginning effort to disentangle the causal relations, we examined our data further, including looking at maternal perceptions of their children's task motivation. Several different lines of thinking indicated that the mothers' level of directiveness was more likely part of their general interactive style rather than responses to their children's need for help during the particular task situation we devised.

The first line of thinking was based upon the correlations for the individual tasks. If the mothers' directiveness was in response to their children's difficulty in doing the tasks, then correlations between directiveness and IQ should be strongest on the most difficult tasks. Our findings did not show this pattern; instead, on both easy tasks and hard tasks, mothers of children with lower IQ's were more directive.

The second line of thinking was based on the fact that our measure of maternal control was assessed only during the first minute of each task. Thus, this measure represented only the mothers' initial strategy for helping their children respond to the problem. The mothers had not yet had an opportunity to see what their children were able to do on these unusual tasks. More controlling mothers seemed to assume that their children could not or would not do the tasks on their own.

The third line of thinking directly examined maternal perceptions of their children. These findings support the idea that more controlling mothers assume their children cannot or will not do the tasks on their own. Correlations between maternal behaviors and maternal perceptions of task motivation are shown in Table 3. The correlations shown are with SES partialled out; however, partialling out SES had only a minor effect on these correlations. Mothers' behavior with their children was strongly related to their perceptions of their children's motivation. More controlling mothers saw their children as less intrinsically motivated ($r = -.57$, $p < .05$). Warmer mothers saw their children as more intrinsically motivated ($r = .35$, $p < .05$). Interestingly, the mothers' behavior with their children was not influenced by how much they thought their children sought adult help, sought adult structure or resisted adults. In other words, mothers' behavior with their children did not seem to relate to the children's need for direction but instead seemed to relate to the mothers' general perceptions of their children's motivation.

Taken together, our data suggest that the mothers' behavior in our session was representative of the mothers' general style of interacting with their children as mediated by their perceptions of their children's motivation. Our limited information suggests that mothers' directiveness is not a response to their children's specific need for help during the particular task situation we devised. The causal inferences that can be made from our data are limited. We are, however, studying this same group of children and mothers again this year. The use of cross-lagged panel correlations with this longitudinal data should allow us to make more definitive statements about the casual relations between maternal and child behaviors.

## DISCUSSION

The results we have presented indicate that the quality of maternal interaction is related to both children's cognitive development and to the quality of their play. These conclusions are in agreement with the conclusions of Hatano, Miyake, & Tajima (1980). Mothers' willingness to give more control to their children apparently facilitates cognitive growth by allowing children greater freedom to explore their environment. This exploration permits children to form their own conclusions based on interactions with objects. From a Piagetian viewpoint, cognitive development is facilitated most by the child's own actions with objects. This process is especially important for cognitive development in nonverbal areas. The effects of maternal warmth upon children's cognitive development are apparently accounted for by the family's socioeconomic standing.

Children's play is also related to the quality of maternal interaction. Maternal warmth appears to enhance children's ability to organize their play activities in meaningful ways. This finding is consistent with studies of younger children demonstrating that more securely attached infants and toddlers are generally more competent and adaptive, particularly in their play (Clarke-Stewart, VanderStoep, & Killian, 1979; Matas, Arend, & Sroufe, 1978; and Waters, Wippman, & Sroufe, 1979). A warm mother provides a secure base for the young child to explore the world; thus, she facilitates the separation-individualization process (Mahler, 1975) which allows for more autonomous and competent functioning on the part of the child. In conclusion, even within a normal population, the quality of maternal interaction appears to contribute to children's cognitive development and to the quality of their spontaneous play.

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Table 1

Correlations of Maternal Behaviors with Children's Cognition and Free Play

| CHILD VARIABLES | MATERNAL VARIABLES: Control | Directiveness rating | Praise / affection | Warmth rating |
|---|---|---|---|---|
| Cognition | | | | |
| McCarthy IQ | -.36* | -.26 | .37* | .35* |
| Verbal | -.20 | -.26 | .28 | .25 |
| Perceptual performance | -.44* | -.22 | .30* | .30* |
| Quantitative | -.37* | -.18 | .41* | .41* |
| Free Play | | | | |
| Mean duration of play activities | -.17 | -.06 | .36* | .22 |
| Percent time unfocussed | -.14 | -.12 | -.31* | -.11 |
| Complexity of play activities | -.09 | .00 | .38* | .25 |
| Other | | | | |
| SES | -.22 | -.16 | .42* | .34* |

Table 2

Correlations of Maternal Variables with Children's Cognition and Free Play with SES Partialled Out

| CHILD VARIABLES | MATERNAL VARIABLES | | | |
|---|---|---|---|---|
| | Control | Directiveness rating | Praise / affection | Warmth rating |
| Cognition | | | | |
| McCarthy IQ | -.30 | -.22 | .24 | .23 |
| Verbal | -.15 | -.22 | .18 | .15 |
| Perceptual performance | -.40* | .17 | .13 | .19 |
| Quantitative | -.32* | -.14 | .29 | .32* |
| Free Play | | | | |
| Mean duration of play activities | -.15 | -.04 | .35* | .20 |
| Percent time unfocussed | -.16 | -.13 | -.32* | -.10 |
| Complexity of play activities | -.07 | .01 | .38* | .23 |

Table 3

Correlations of Maternal Behaviors with Maternal Perceptions of Task Motivation with SES Partialled Out

| CHILD VARIABLES | MATERNAL VARIABLES | | | |
|---|---|---|---|---|
| | Control | Directiveness rating | Praise/ affection | Warmth rating |
| Perceived task motivation | | | | |
| Intrinsically motivated | -.57** | -.47* | .03 | .35* |
| Prefers easy tasks | .17 | .24 | -.13 | -.26 |
| Seeks adult help | .23 | -.05 | -.01 | .16 |
| Seeks adult structure | -.06 | -.06 | -.02 | .08 |
| Resists adult | -.07 | -.21 | .02 | .27 |